UKRAINIAN DEFENSE REVIEW

№4 [ OCTOBER-DECEMBER 2017 ]

UDR

Defense express

# ATTACKING FALCON

PJSC "CHEZARA" AND WB ELECTRONICS OFFERS UKRAINE'S ARMED FORCES UAS SOKIL, WHICH CONSIST OF FLY EYE AND WARMATE UAV SYSTEMS

NEW

# PROJECTS FROM UKRAINE

MADE IN UKRAINE

## MOBILE MORTAR SYSTEM UKR-MMS

A NEW SOLUTION OFFERED BY UKROBORONSERVICE

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# UKRAINE'S DEFENSE AND SECURITY SPENDING-TO-GDP RATIO KEPT AT 5 PCT GDP FOR FY2018

**Ukrainian President Petro Poroshenko has signed Executive Order No. 278/2017 to enact Ukraine's National Security and Defense Council resolution of September 13, 2017 on «2018 State Budget Draft Law Proposals Relating to National Security and Defense".**

Oleksandr Turchynov, the Secretary of the National Security and Defense Council has been charged to supervise the enforcement of the National Security and Defense Council Resolution which this Executive Order enacts.
The resolution reads that the Cabinet of Ministers should, in drafting 2018 state budget plan, ensure defense and national security funding at 5 pct GDP minimum, but not lower than UAH 165.3 billion (USD 6.3 billion).
Of this amount of funding, UAH 83.3 billion (USD3.2bn) should be allocated to the Ministry of Defense, UAH 11 billion (USD0.4bn) to the National Guard, UAH 24.3 billion (USD0.93bn) to the National Police, UAH 9 billion (USD0.34bn) to the State Border Guard Service Administration, UAH 10 billion (USD0.38bn) to the State Emergency Service, and about UAH 7.5 billion (USD0.28bn) to the Security Service of Ukraine.
The Cabinet was furthermore instructed to consider the possibility of allocating funds in 2018 for financing the 2021 State Program for establishing domestic production of munitions and specialist chemical products and the 2021 State Program on Defense Industry Development, at the level of 0.5 pct GDP. The funds needed for the two programs should be allocated as an addition to the lowest allowed defense and national security expenditures level set by Concept Paper on Ukraine's Security and Defense Sector Development, enacted by Presidential Executive Order No. 92 of March 14, 2016.
Also in 2018, measures should be taken to ensure first-priority funding for the defense and security sector entities involved in the following areas of focus: enhancing and strengthening the National Air Defense and Air Force capabilities; enforcement of national cyber security policy; upgrading, updating and further development of special communications and data security capabilities; implementation of the 2016-2020 National Intelligence Program; enhancing counter-intelligence capabilities for counter-narcotics, counter-terrorism and counter-sabotage operations; intensive combat training of the Armed Forces personnel and other official militarized personnel; physical demarcation of Ukraine's State Border; provision of social security protection to military servicemen, especially in terms of ensuring a higher proportion of official salary and grade/military rank salary in monetary allowances to military personnel.

# UKRAINE UPDATING ITS ARMED FORCES CONCEPT

**Ukraine is drafting its updated Concept of the Armed Forces, projected into 2030.**

This was announced to the press on August 16, 2017 by Lt. Gen Ihor Romanchenko, CEO of the Ukrainian Armed Forces' Central Scientific Research Institute.

The Institute is carrying out projects commissioned by the Reforms Committee at the Ministry of Defense to develop a unified approach to establishing a new military logistics network for Ukraine's Armed Forces and endowing it with appropriate capabilities. The

Institute has developed a set of simulation models and is continuing work to improve command and control capabilities.

"Based on the outputs of the research conducted, we have developed recommendations concerned with the choice of areas of focus for Ukraine's armaments development strategy, with due account taken of the country's defense industrial capabilities for the manufacturing and upgrading of weapons and military equipment. Operational requirements documents on over five dozen weapons development projects have been produced over the past 18 months alone. I have in mind mortars of various calibers, air-to-ground munitions, drones, a missile and launcher system, and military armored vehicles," Romanchenko said.

In this context, he said, a research is being conducted to prove feasibility of the proposed Ukrainian Armed Forces Concept 2030.

# UKROBORONPROM CONTRIBUTED NEARLY USD 0.5B IN TAXES TO GOVERNMENT COFFERS OVER ITS LAST THREE YEARS OF EXISTENCE

**Ukroboronprom State-owned defense industries holding company, Ukraine's major defense contractor, contributed nearly UAH 12.5 billion (USD 0.45B) to the government's treasury over the period from 2014 to 2016, as suggested by the Company's Financial Statement for said period.**

Ukroboronprom reported a net income of nearly UAH 65 billion for the period under review. The Company's net income is growing yearly, indicating sustainable development of the country's defense industrial capacity.

Ukroboronprom is performing contracts under state defense procurement and acquisition programs, supplying the Ukrainian military with requisite capabilities contracted by the Government.

The Company successfully completed 100 percent of contracts included in the State Defense Procurement and Acquisition Plan 2014-16.

# ANTONOV TO BUILD 70 AIRPLANES OVER THE NEXT FIVE YEARS

Antonov State Company, Ukraine's leading aircraft developer and manufacturer, has developed «a marketing plan" that envisions production of 70 airplanes within the next five years.
The manufacturer's marketing plan is based on"forecasts and assessments by independent experts and leading companies", parent company Ukroboronprom reports in a press statement.
The plan accounts for capacity of existing and prospective marketplaces, as well as the potential demand for the Company's products on each of those marketplaces, and it relies on agreements reached with partners.
According to the marketing plan, the worldwide market for medium payload cargo airplanes will be able to absorb 900 units over the next 15 years. Based on this estimate, Antonov is planning to sell two dozen An-178 aircraft on markets in the CIS, Asia and Africa as well as Turkey within the next five 5 years.
Further to this, Antonov aims to come back to the highly competitive market of regional passenger aircraft.
In April 2015, the Cabinet of Ministers included Antonov as part of the Ukroboronprom state-owned defense industries conglomerate.
Once incorporated with Ukroboronprom, Antonov stopped using Russian-sourced components and found alternative parts sources. The proportion of Russian-sourced components in the An-178 aircraft, for example, amounted to 41 percent in 2015 and reduced to zero the following year as the Company had found alternative suppliers.

# UKRAINE SUCCESSFULLY TESTS ITS FIRST BOMBER DRONE

The «Sokil» strike-drone system will be adopted for service with Ukraine's Armed Forces in 2017, CEO of Chernihiv Radio Equipment Plant (CheZaRa) Anatoly Sviridenko told reporters on September 14, 2017.
The Sokil system – a collaboration between Ukrainian and Polish partners – is 40 percent Ukrainian made and 60 percent Polish made, but in costs terms this ratio is 50/50, he said.
Sokil consists of one reconnaissance drone and three strike combat drones, all launched from Kozak armored vehicles developed and produced by NVO Practika, Kyiv.
CheZaRA is attached to the project as developer of strike and attack capabilities.
On September 14, 2017 at Honchariv test and training facility outside Chernihiv, Northern Ukraine, the drone had its capabilities tested when on a flight.
The tests showed that the Sokil system can detect and accurately hit targets using the high-explosive, blast-fragmentation, and thermobaric munitions with which it was loaded. The drones operated successfully even though weather conditions were challenging, including high winds.
Oleksandr Turchynov, Secretary of Ukraine's National Security and Defense Council, who attended the tests, said Ukraine will work to extend the range and"combat characteristics" of the drones, but they will be officially commissioned soon.
«The tests were successful, they demonstrated the effectiveness of these unmanned systems," Turchynov said. "The next step is to accept them into military service and use effectively in combat operations".

# MOTOR SICH AIMS TO BOOST ITS HELICOPTER PRODUCTION BUSINESS

**Motor-Sich, Ukraine's aircraft engine giant, has an ambition to expand substantially its helicopter production business by 2018.**

"We are working this year on development of helicopter technologies," Anatoly Malysh, Supervisory Board Chairman and PR executive at Motor Sich told reporters.
"Unlike the past, when we were upgrading and modifying legacy helicopters, we are now preparing to launch production of our own helicopter designs. Our future lies in helicopters, and I do hope that the outputs will be there next year," he said.
Moreover, Motor Sich offers helicopter pilot training services at its Simulator Training Center equipped with full-mission simulators for Mi-2, Mi-24, Mi-8 MSB-V, and Mi-8-MSB helicopters.
Plans for this year also include a production line for propeller blades to be used on Mi-24 helicopters operated by Ukraine's Armed Forces.
It was revealed in August that Motor Sich would start the production of helicopters in 2018. The model that will be produced, called the Nadiya (Ukrainian for"hope") will seat up to 7 passengers and will have a range of 1,000 kilometers. The baseline Nadiya technology can then be modified for special purposes for use by emergency and disaster response services, state border security forces, and air ambulance teams.
Motor-Sich, Zaporizhzhia, is focusing on the production of aircraft engines and aircraft gas turbine powerplants. Engines produced by Motor Sich are used on fixed-wing and rotor-wing aircraft operated in over 120 countries worldwide. The Company is celebrating its 110th birthday this year. It currently employs a workforce of up to 25,000.

# UKRAINE, POLAND JOINTLY DEVELOP NEW MAIN BATTLE TANK

**Ukraine and Poland unveiled the new PT-17 main battle tank prototype at this year's edition of MSPO-2017 arms expo in Kielce, Poland, a Defense Express correspondent reported.**

The new tank, developed as a heavily upgraded version of the Soviet-designed T-72 MBT, is a collaboration between Ukrainian and Polish military production companies.
In April 2017, Poland's Zaklady Mechaniczne "Bumar – Labedy S.A. and Ukraine's UkrOboronProm state-owned defense industries conglomerate agreed on a deal to co-develop a new tank based on the proven Soviet-era T-72 MBT technology.
Partnership on the PT-17 MBT project was proposed by Poland, but it's worthwhile to recall that Ukraine and Poland both keep substantial inventories of T-72 tanks left behind after the demise of the Soviet Union.
As its contribution to the project Ukroboronprom began integration of the best domestic technological developments. More specifically, it has produced and delivered an automatic loading system, a new engine, transmission, new 120mm main gun, fire control system, explosive reactive armor system, and a Turret demonstrator.
Developed to meet potential Polish army requirement, the PT-17 tank is built to NATO compliance.
«This project is a clear signal and a demonstration of Ukraine's ability to participate in such large-scale and technologically complex projects. An important element of this collaboration is that the future tank will be built to NATO standards, while the Ukrainians have developed and are ready to manufacture key components in accordance with these standards. Not only does this indicate the availability of scientific, technological and manufacturing capabilities, but that such systems and standards can in the future be easily integrated and implemented in other Ukrainian technologies. This, also, could give a jumpstart to Ukrainian military's modernization with NATO-compatible technologies," Roman Romanov, CEO of Ukroboronprom says.
With potential procurement of the PT-17 MBT by Poland's Defense Ministry, Ukrainian companies stand a good chance to get a share in Poland's military technical modernization programs with a total cost of several hundred million US dollars.

## UKROBORONPROM UNVEILS T-72AMT

**Ukroboronprom has developed a new upgraded variant of the T-72 main battle tank to be known as T-72AMT.**

Built to the Ukrainian Armed Forces' specifications, the T-72AMT upgrade was developed and financed privately by Ukroboronprom's Kyiv Armored Vehicles Factory, according to a report by Defense Express.
The upgrade incorporates enhancements that include (but are not limited to): night vision equipment with third-generation EO converters; the 1K13 night sight enabling night firing with the 125mm Kombat gun-fired laser-guided missile, which is capable of penetrating 550 mm of RHA behind explosive reactive armor; the V-84-1 engine replacing the B-46 engine used in the original vehicle; an explosive reactive armor system (similar to that used in the T-72UA upgrade); the Aselsan radio; the SN-3003 "Bazalt" navigation suit; caterpillar driving wheels (similar to those employed in the T-80 upgrade).
Vadym Shkavro, CEO of Kyiv Armored Vehicles Factory, says he likes the T-72AMT most among the other upgrade packs proposed for the T-72, because it was developed (and within a very tight timeframe) based on real-world feedbacks from Ukrainian government forces deployed in the Donbas conflict area.
The first T-72AMT upgrade prototype was unveiled at an exhibition of new military products timed to coincide with celebrations for the 26th anniversary of the Ukrainian independence.
The T-72AMT has now entered the stage of departmental trials.

# KORSAR ATGM SYSTEM INTRODUCED INTO SERVICE WITH UKRAINE'S ARMED FORCES

**Ukraine's Ministry of Defense has issued a directive ordering that the "Korsar" light portable anti-tank guided missile (ATGM) system be commissioned for operational use by the Armed Forces of Ukraine.**

The Korsar (Corsar) ATGM system is a project developed by "KKB Luch" R&D company of the Ukroboronprom state-owned defense industries group.

The decision to commission the Korsar followed successful completion of factory trials and qualification tests that proved the product is up to required specifications and performance.

Luch has already produced ahead of schedule and delivered over 50 Korsar ATGM launchers and the Customer requested amount of Korsar missiles to forces in the field.

The Korsar is of light, man-portable design allowing the missile to be launched off shoulder without the need of using any additional devices. However, for convenience of use from prepared positions (as in defensive operations), a tripod mount can be attached.

The Korsar fires a 107 mm missile at ranges from 50 to 2,500 meters (same range as allowed with the FGM-148 Javelin). The missile is guided by a laser beam to its target, the beam being low powered to reduce the risk of detection by enemy's sensor network.

There are two options of missiles available for the Korsar application.

The RK-3K, armed with a tandem HEAT warhead, is meant to defeat modern targets, both fixed and relocatable, protected with combination/spaced/rolled homogenous armor (RHA) behind explosive reactive armor (ERA), as well as helicopters while hovering at low altitudes. This warhead is able to penetrate 550mm+ of RHA behind ERA.

The RK-3OF missile with its explosively formed penetrator warhead is effective against soft armored targets, field fortifications (like pillboxes or timber-and-sand fortifications) as well as enemy personnel. During trials, the RK-3OF was able to pass through a steel armor plate 50 mm thick.

The guidance unit used in the Korsar ATGM is the PN-KU developed by Ukroboronprom's Izyum Instrument Factory. The PN-KU has a maximum range of 2,500 m.

# UKRAINE PROCEEDING WITH T-64-BV-1 TANK DELIVERIES TO DRC

**Ukraine has continued implementing a contract for the export of refurbished and upgraded T-64BV-1 tanks to the Democratic Republic of the Congo (DRC), according to 2016 report released by Ukraine's State Service for Export Control.**

As at this date Ukraine has delivered some 25 T-64BV-1 tanks out of 50 such tanks contracted by DRC in 2014, the report says.

Later in 2014, due to the opening of hostilities in the Eastern Ukrainian region of Donbas, the initial ten tanks due for delivery to DRC were delivered to Ukraine's National Guard instead, and the parties agreed to postpone contract completion date.

Previously Ukraine was a regular supplier of MBT vehicles and other weaponry types to DRC. Specifically in 2010, Ukraine exported 30 T-55s and 100 better-equipped T-72AVs to DRC, but delivered none of tanks to that country in 2011-12, according to the UN Registry of Conventional Arms.

# U.S. NAVY SEABEES BUILDING MARITIME OPERATIONS CENTER ON OCHAKIV NAVAL BASE

**U.S. Navy Seabees are building a maritime operations center on Ukraine's Black Sea Coast, for use during annual U.S. and Ukrainian military exercises and to assist allied maritime operations.**

Seabees assigned to Naval Mobile Construction Battalion (NMCB) 1 are constructing the $750,000 maritime operations center on Ukraine's Ochakiv Naval Base, located near Odessa. When complete, the center will serve as major planning and operational hub, conducting command and control of Black Sea-region maritime assets during Sea Breeze, the annual joint U.S. and Ukrainian military exercise.

"Beginning construction in Ukraine is a significant accomplishment for NMCB 1," Lt. j.g. Jason McGee, the officer in charge of Detachment Ukraine, said in a written statement. "Our ability to maximize European reassurance initiatives in Ukraine holds strategic importance, and will ultimately improve host nation defense capacity and infrastructure, strengthen relations, and increase bilateral training capabilities."

Seabees have been in Ochakiv since April, establishing contracts, obtaining construction permits, and performing other logistical necessities needed for long-term sustainment of the maritime operations center. Once complete, Ukrainian naval forces will operate and maintain the center. Outside of the annual Sea Breeze exercise, the center will assist Ukraine's ability to coordinate activities with allies operating in the Black Sea.
Separate from the operations center project, the U.S. Navy plans to construct a boat maintenance facility at Ochakiv.
Ukraine's Defense Ministry, in February 2017, reported that the Ukrainian Navy is considering procurement of Western naval ships being removed from service.

# ANOTHER TWO GYURZA-CLASS ARMORED GUNBOATS ARRIVE IN ODESA TO JOIN THE UKRAINIAN NAVY

**On September 9, 2017, two Gyurza-M-Class armored gunboats built by "Kuznya on Rybalsky" (formerly known as Leninska Kuznya) shipyard company arrived in Odessa to enter service with the Ukrainian Navy, the Navy's press center reported.**

The Project 58155 «Gyurza-M» was developed as a follow-on to the Project 58150 "Gyurza" technology by Shipbuilding R&D Center, Mykolaiv. The range of missions for the Giurza-M could include security patrolling of littoral waters; river and lake policing; fighting small hostile ships; protection of off-shore infrastructures; support for sea-to-land and border guard operations; support for maritime safety; and reconnaissance and logistics support.
The armaments package for the Gyurza-M includes two combat modules BM-5M.01 "Katran-M" supplied by Mykolayiv Machinery and Repair Plant. The BM-5M.01 "Katran-M" is a naval counterpart of the BM-3 "Storm" combat module that was originally designed for armored fighting vehicle applications. Each "Katran-M" module accommodates a 30-mm ZTM1 rapid firing gun, a coaxial KT 7.62mm machine gun, and two "Barrier" ATGM launchers, and a MANPAD system is additionally provided to protect against aerial attacks. Control of the weapons is performed with an optronic fire control system.
Navigation is provided with the "Delta-M" radar system supplied by Kvant-Radiolocation, Kyiv. Other equipments include the optoelectronic, small-to-medium caliber gun fire control system "Sarmat" and a set of laser warning sensors.
The Ukrainian Navy is scheduled to procure 18 Gyurza-M Class gunboats by 2020. Two Project 58155 boats, named U-174 Akkerman and U-75 Berdyanks, joined the Navy in 2016.

# UKRAINE DEVELOPS A NEW HYDROACOUSTIC SYSTEM FOR ITS NAVY

**The State-owned defense industries corporation Ukroboronprom is hopeful that its new sonar system it developed to meet the Ukrainian Navy's requirement will soon be brought through government trials and approved for commissioning, the Company said in a press statement.**

Hydroacoustic buoys developed and produced by Ukroboronprom's R&D Institute of Sonar Technology, Kyiv, faired well, performing a submarine search and detect mission during Sea Breeze-2017 multinational exercises that took place off Odessa's Black Sea coast from July 10 to 22 with 16 participating countries. The sonobuoys successfully detected the Turkish TCG Batiray (S-349) submarine that served as a simulated enemy, and transmitted its location to Ukraine's flagship vessel, the Hetman Sahaidachny frigate, Ukroboronprom reported.
«Ukrainian seamen were tracking the Turkish submarine's movements for longer than an hour. That would be enough to destroy the enemy if it were a real-world situation,» the statement says.
A similar task was performed and succeeded by the U.S. Navy's USS Hue City (CG66) cruiser assisted by a P-8 Poseidon airplane.
The new sonar product incorporates technological innovations that enable substantially enhanced performances and would contribute to a stronger anti-submarine warfare capability of the Ukrainian Navy.
The new sonar technology is now being considered for government trials and subsequent commissioning.

[firepower]

# UKRAINAIN GOVERNMENT ANNOUNCES PROCUREMENT OF OPLOT MBTS FOR THE MILITARY

**Ukraine's military is about to get new Oplot MBT vehicles soon, as announced by the country's military and political officials in July/August 2017.**

Particularly Stepan Poltorak, the Minister of Defense, said the new MBT vehicles would be procured in amounts the MoD budget will be able to absorb, and initial deliveries are expected to begin soon. "Our policy previously was that MBT units were 50-70 percent below establishment in tanks and other combat vehicles, and a new Oplot MBT is ten times the cost of a used, but refurbished and updated counterpart. At present, MBT units have been brought up to establishment, and a certain number of vehicles are in stock for the Reserve Corps. So the situation is now such that we can afford procurement of new equipment", the Defense Minister said.

President Petro Poroshenko, the Supreme Commander-in-Chief of Ukraine's Armed Forces, said, for his part, "We have updated the National Budget 2017 with the intent that initial deliveries of Malyshev Factory's Oplot MBT vehicles to the Armed Forces could begin even before the end of this year. This is our response to the wishes of Ukrainian tankmen".

The Oplot main battle tank is a tracked armored fighting vehicle that provides an impressive amount of firepower, reliable protection and excellent maneuverability performance. Developed by Morozov Machinery Design Bureau, it is being produced by Malyshev Factory, Kharkiv. The Oplot was officially adopted by Ukraine's Armed Forces in May 2009.

The tank has a conventional layout with the driver's compartment at the front, fighting compartment in the middle and engine at the rear, accommodating a crew of three. The tank's main armament is the KBA-3 125 mm smoothbore gun stabilized in traverse and elevation, with the armor-protected autoloader located in the rear turret. The main gun can fire domestically produced laser guided missiles Kombat to ranges out to 5,000 m, in addition to high explosive fragmentation (HE-FRAG), armor-piercing fin-stabilized dis-

carding-sabot (APFSDS), high explosive anti-tank (HEAT) and gun mount (GM) rounds.

The protection system integrates passive armor, explosive reactive armor and tank protection means optimized to reduce vulnerability to current-generation anti-tank threats. Modules of the 'Duplet' explosive reactive armor system are mounted on the hull front, turret and hull sides of the vehicle, providing robust protection against all the known anti-tank rounds.

Oplot-M is powered by a 6TD-2 six-cylinder, liquid cooled diesel engine which delivers a maximum horsepower of 1,200 and is optimized for all weather conditions, including in hot climates.

The vehicle stands out among all of the currently existing counterparts by the ability to cross 1.9m deep water obstacles without preparation, while preparation time for crossing river-line obstacles of up to 5m deep does not exceed 20 minutes.

As Malyshev is busy with production of Oplot MBTs for Ukraine's military, it has to deal also with a $240M contract signed in September 2011 by SC "Ukrspecexport" to export 49 Oplot tanks and two derivative repair/recovery vehicles to the Royal Thai Army. The contract is still in progress, three years after it was to be completed in 2014. It is expected now that final deliveries under this contract will be completed in late 2017. A combined total of 39 Oplot tanks had been delivered in five shipments to Thailand as at summer 2017.

The Oplots intended for the Ukrainian military will be improved and updated to meet modern challenges and threats. Proceeding on this track, the Ministry of Defense is planning 14 R&D projects aimed to replace some of the tank's key systems with more current-generation counterparts. Related objectives to be achieved by this modernization effort are to ensure maximum possible use of modern materials and assembly units, and to eliminate dependence on Russia in the tanks & armored vehicles industry. Malyshev Factory will be the major contractor in most of the Oplot-related projects. Keeping these considerations in mind, military experts are warning against being too optimistic about when the tasks will be finished.

The Oplot is able to change altogether the rules of the game on the battlefield, since it is the Ukrainian military's only fielded weapon system equipped with a command and control information management system (IMS) interfaced with the tactical C4 network. The new Oplot tank offers a great promise in that it can provide a perfect platform for new breakthrough solutions. But before this happens, the technology has to be adapted to the needs of the Ukrainian military, especially in terms of personnel training, operational coordination between MBT units, and creation of appropriate logistics networks. It is not until these challenges are met that the Oplot can become a true force multiplier for the Ukrainian army. UDR

[ proven by battle ]

# MADE IN UKRAINE – BTR-4 AMPHIBIOUS APC

**The BTR-4 armored personnel carrier (APC) is one of the best known military vehicles developed in Ukraine since independence. Designed from scratch by Kharkiv Morozov Machinery Design Bureau (KhKBM) and named "Bucephalus" after Alexander's horse, the BTR-4 epitomizes the strength, power and reliability. It shares only the armor protection with its Soviet-era predecessor, the Designer claims. The BTR-4 has a layout that is similar to that found in Western counterparts, and it is NATO-compatible. Nowadays Bucephalus is a "faithful servant" of Ukraine's military forces, especially those fighting separatist rebels in the country's eastern Donbas region.**

The BTR-4 is designed for battlefield troops transport and to provide fire support to dismounted troops. It is intended to support Army units operating in various battlefield environments and conditions, including NBC environments. The BTR-4 is well suited to support missions performed by special operations/rapid reaction forces and marine forces. It has been designed to operate on road and cross country in extreme climates and adverse weathers, at day and night.

The BTR-4 hull is divided into three compartments, with the driving compartment in the front hull, the power pack compartment in the mid-center left hull and the fighting and personnel compartments at the rear of the hull. The power pack compartment is located immediately behind the driver's seat on its left, and it is linked to the troop compartment via a right-side passageway. The troop compartment in the rear hull has a two-part door (upper and lower parts which open outwards) for troop mount/dismount. The commander and

driver can enter and exit the vehicle by side doors fitted with integral bullet-resistant windows. The windscreen is likewise of bulletproof glass-block construction, and it can be additionally protected with back folding armor screens.

The BTR-4 layout design - which allows its fighting and troop compartments to be easily reconfigured without the need of rearranging the engine-transmission block - could be used as baseline configuration for a comprehensive family of armored fighting vehicles. The baseline BTR-4 design can form

a basis for a family of specialist vehicles, including fire support vehicle, command/staff vehicle, armored medical evacuation vehicle, self-propelled anti-aircraft gun system, reconnaissance and observation vehicle and repair/recovery vehicle.

The APC's chassis has load carrying capability that allows for a broad variety of spinoff variants and AFV families to be designed on its basis, and it additionally enables installation of appliqu armor protecting against automatic small-caliber gun fire attacks. The vehicle's hull offers STANAG 4569 Level 3 anti-mine blast protection, meaning it withstands under-wheel detonation of 8 kg TNT equivalent (the level of under-belly mine blast protection has not been disclosed by the Designer).

This armored troop carrier can accommodate multipurpose above-hull weapons stations of various types, including especially those designed for lighter weight armored vehicles. The proposed selection of weapons stations includes Ukraine's indigenous BAU-23, STORM, GRIM and PARUS, but foreign-supplied counterparts can be installed if the Customer requests so.

The BTR-4 has been inducted into service with the Ukrainian Armed Forces and National Guard, and already got its baptism by fire in the battle of Slovyansk in June 2014. The vehicle's armor withstood direct hits from heavy machine guns, while slat armor provided protection against armor-piercing attacks. In one engagement, a bullet-proof window on the BTR-4 vehicle withstood a direct hit from a large-caliber sniper rifle. Official year-long statistics suggests that only one Ukrainian soldier was killed while being within a BTR-4 vehicle deployed in the Donbas conflict area.

The BTR-4 has been undergoing continuous improvements based on lessons learned from its use in actual combat operations, with over 50 capability-enhancing changes introduced so far. Most recent updates dealt with the chassis and vehicle systems. Production-grade BTR-4 features an enhanced armor protection system that can be repaired or replaced under field conditions. Equipped with a Deutz engine, the vehicle boasts a reduced acoustic signature.

All the components and subsystems in the BTR-4 that used to be imported from Russia previously have now been substituted for domestically produced equivalents. In 2014, the vehicle had 45 per cent of its components supplied by Russia, 45 percent produced domestically in Ukraine, and 10 per cent imported from foreign markets. In 2015, the Bucephalus began to be manufactured with none of Russian-supplied components used, while the proportion of domestically produced components in the vehicle increased to 65 percent in 2015 and 85 per cent in 2016.

The BTR-4E, an upgraded and updated modification of the BTR-4 vehicle, was subjected to trials at a military proving ground outside Kharkiv in the spring of 2017. The upgraded vehicle now provides even better level of protection for its occupants, its bullet-resistant windows withstanding direct hits of 12.7 mm and 7.62 mm rounds. Other improvements include enhanced mine blast protection, improvements in the turret, weapons control and ammunition feed systems, and the addition of an auxiliary power supply unit to enable the turret system to run without the main engine running.

In the winter of 2017, an export variant of the BTR-4 vehicle successfully completed amphibious trials at sea, and


trails in mountainous and limited-access areas of Indonesia. All the five vehicles exported by Ukraine to Indonesia's Marine Corps under a 2014 contract successfully hit their targets during firing trials.

Ukroboronprom, Ukraine's major defense contractor is now dealing with converting the BTR-4 vehicle to a self-propelled 120-mm mortar system. This is being done as a bilateral project involving Morozov Design Bureau of Ukraine and Huta Stalowa Wola of Poland.

As we can see, Ukraine – despite the need to deal with a full spectrum of scientific, technological, production and organizational issues – has been successful in creating new types of armored equipment to enable security forces to effectively perform their missions even in most challenging combat encounters. UDR

**It has been more than fifteen years since Kharkiv Morozov Machinery Design Bureau developed its BTR-3E armored personnel carrier (APC) vehicle. During this period, the vehicle, which is being produced by the Kyiv Armored Vehicles Factory, has not just proven its worth, but undergone a number of capability-enhancing changes to its design. Recently, the BTR-3DA upgrade has been developed based on lessons learned with the use of the BTR-3E vehicle in Eastern Ukraine's Donbas Oblast region.**

# A NEW WIND FOR UKRAINE'S BTR-3 APC

Anton MIKHNENKO, UDR

The BTR-3 is a 8x8-wheeled APC vehicle designed for battlefield troops transport and to provide fire support to dismounted soldiers. It is intended to support infantry forces operating in various battlefield environments and conditions, including NBC environments.

Since 2002, the BTR-3 product family has been expanded to include configurations such as the BTR-3U, BTR-3U1, BTR-3E, BTR-3E1, BTR-3 ARV towing truck, BTR-3 CPWS-30 fire support vehicle, BTR-3M1/M2 self-propelled mortar, BTR-3K command vehicle, BTR-3C battlefield ambulance, BTR-3RK self-propelled anti-tank gun, and BTR-3BR armored repair/recovery vehicle. The BTR-3 has been exported in different configurations to more than a dozen country markets, Thailand being the biggest customer with over two hundred BTR-3E1 vehicles delivered.

Experiences with the use of BTR-3 vehicles in real-world operational scenarios in the Donbas Theater of Operations revealed the need for comprehensive improvements to the vehicle's design. Nearly 740 changes have been made to produce an actually new vehicle with enhanced capabilities, known as BTR-3DA.

During 1Q and 2Q 2016, Kyiv Armored Vehicles Factory built two prototype BTR-3DA vehicles, each equipped with a four-stroke, six-cylinder Deutz BF6M 1015CP liquid-cooled diesel engine coupled to an Allison 3200SP automatic transmission.

At the current stage of development, the BTR-3DA can negotiate a slope of 30o, and can cross vertical obstacles of 0.7 m and trench obstacles of 2 m. When loaded to its full combat weight of 16.5 tons, it can develop up to 104 km/h speed on highway.

The BTR-3DA is fitted with the BM-3M "Storm-M" weapons station. This is stabilized in two axis using a current-generation digital SVU-50-4S stabilizer system with solid-state gyroscopes. The weapons station accommodates a conventional 30-mm ZTM-1 automatic gun with 350 rounds of ready-use ammunition, two Barrier anti-tank guided missile launchers, and a 30-mm KBA-117 automatic grenade launcher coaxial with a KT-7.62 machine gun with 2,000 rounds of ready-use ammunition. A panoramic observation system enabling almost 360-degree situational awareness is provided for the crew and infantry passengers.

On the left side of the hull, there is an auxiliary power supply unit allowing the vehicle to run the BM-3M Storm-M weapons station without the main engine running.

The BTR-3DA upgrade provides enhanced armor protection for the crew and infantry squad, with the number of interior protective layers increased from seven to sixteen. It additionally provides enhanced protection against the impacts of shell splinters, and slat armor will protect against anti-tank rocket-propelled grenade threats. To provide the desired level of protection, the vehicle's hull, manufactured domestically by Lozova Forge Mechanical Plant, is built of Belgian-supplied armor steel, but steels manufactured in Poland and Finland are suitable for this purpose too, as recommended by the Designer Authority.

The vehicle has been subjected to a series of very challenging departmental trials that revealed a number of design weaknesses. Some have been eliminated, while the others are being dealt with by the Designer. The Storm-M weapons station is planned to be upgraded with an EO module integrating a thermal imaging camera supplied by Izyum Instrument Factory, Kharkiv Oblast.

The BTR-3DA has been inducted into service with the Ukrainian military, while the other security forces are equipped mainly with the BTR-3E1 and BTR-3E1-U configurations. Vehicles maintenance and servicing are done on spot by respective units' repair teams or field teams from Kyiv Armored Vehicles Factory, which is also responsible for doing repairs at its own facilities in case field repairs are impossible or failed.

The BTR-3DA is fitted with the BM-3M «Storm-M» weapons station. It accommodates a conventional 30-mm ZTM-1 automatic gun, two Barrier anti-tank guided missile launchers, and a 30-mm KBA-117 automatic grenade launcher.

On the left side of the hull, there is an auxiliary power supply unit allowing the vehicle to run the BM-3M Storm-M weapons station without the main engine running.

For more expeditious repairs of BTR-3DA vehicles, each will need to come complete with a group set of tools and accessories containing replacements for most vulnerable parts and components.

Kyiv Armored Vehicles Factory has built two BTR-3K command vehicles so far. These are only differentiated outwardly from their baseline counterpart by virtue of having a number of aerial outputs from vehicle communications and navigation systems.

Kyiv Armored Vehicles Factory has continued work on manufacturing BTR-3DA vehicles required by Ukraine's National Guard.

Overall, the new vehicle has come out pretty good. It has gained a new quality due to improvements introduced based on experiences with its use in real-world operational scenarios in Eastern Ukraine. UDR

# PARAMETRIC COMPARISON BTR-3E1 VS BTR-3DA

| | BTR-3E1 | BTR-3DA |
|---|---|---|
| Vehicle Type | Wheeled, for-axis with all four wheels driving; amphibious | Wheeled, for-axis with all four wheels driving; amphibious |
| Mass | 16 t | 16.5 t |
| Crew | 3 (commander, driver, gunner) | 3 (commander, driver, gunner) |
| Infantry squad | 10 | ≥6 |
| Length | 7,850 mm | 7,850 mm |
| Width | 2,900 mm | 2,900 mm |
| Height | 2,415 mm | 2,774 mm |
| | | |
| Ride height | 450 mm | 460 mm |
| Turn radius | 13.2 m | 13.2 m |
| Max. Speed | | |
| On highway | 100 km/h (during one hour) | 100 km/h |
| While afloat | ≤8 km/h | 8 km/h |
| Fuel consumption per 100 km | | |
| On highway | 49 l | 49 l |
| While off-road | 92 l | 92 l |
| Fuel range | | |
| On highway | | |
| ≤600 km | | |
| ≤600 km | | |
| While off-road | 360 km | 360 km |
| Max. angle of ascend | 300 | 300 |
| Max. angle of side-slope stability | 250 | 250 |
| Weapons station | BM-3 Storm | |
| | BM-3 Storm-M | |
| Armaments by type | ZTM-1 automatic gun, KBA-17/AGS-17 automatic grenade launcher, PKT-7.62 machine gun, Barrier ATG missile launcher | ZTM-1 automatic gun, KBA-17/AGS-17 automatic grenade launcher, PKT-7.62 machine gun, Barrier ATG missile launcher |
| Engine | Inline, four-stroke, six-cylinder, liquid-cooled diesel | V-type, four-stroke, six-cylinder, liquid-cooled diesel |
| Engine brand | MTU6R106TD21 | DEUTZ BF-6M 1015C (EURO2) |
| Transmission | Allison 3200 SP automatic transmission | Allison 3200 SP automatic transmission |
| Auxiliary power supply unit for the weapons station | Non-available | Available |

UkrOboronProm
Ukrainian Defence Industry

60 MW

45 MW

25 MW

16 MW

10 MW

6 MW

5 MW

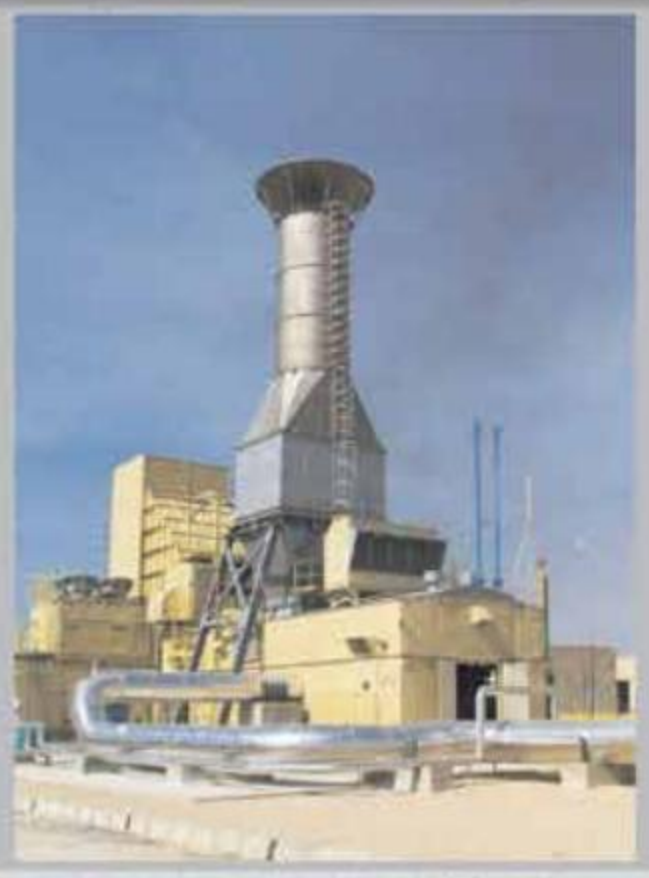
3 MW

2,5 MW

# UKRAINIAN GAS TURBINES

For marine propulsion

For gas industry



For power generation

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# NEW ARMORED VEHICLE PRODUCTS OFFERED BY NVO PRACTIKA

Anton MIKHNENKO, UDR

**NVO Practika R&D and Production Company, Kyiv, is Ukraine's domestic market leader in military armored cars. Practika has supplied its products to the Ukrainian National Guard and Border Security Forces, and has recently got them adopted by the country's Armed Forces. The Company's most recent product portfolio expansion includes the Kozak-2M 4X4 light armored fighting vehicle and the Otaman 8x8 armored transport vehicle.**

At the Kyiv "Arms & Security Exhibition-2017", Practika showed off its lineup of a dozen armored vehicle products, including the Kozak-2M 4x4 and Otaman 8x8.

Kozak-2M is a 4x4-wheeled, independent suspension, light armored fighting vehicle developed to meet the requirements of Ukraine's Airborne Forces and Special Operations Forces. It is essentially an improved iteration of the Company's Kozak-2 vehicle that has been fielded with the Ukrainian Armed Forces since March 2017.

The Kozak-2M vehicle is suited for transportation of personnel, infantry weapons and battlefield supplies in highway/road/off-road settings; to provide tactical operational support for security patrols and vehicle escort missions during special operations; to provide command communications support; and to provide fire support to dismounted infantry soldiers. It can safely ford water obstacles up to 1 m deep.

It is designed to protect the crew and infantry squad from 7.62 mm fire and shell and mine blast fragments.

The Kozak-2M is larger, more capable and better protected compared to its previous-generation counterpart. Its design incorporates improvements and enhancements based on real-world user feedback from soldiers fighting separatist rebels in East Ukraine.

Kozak-2M, just like its older sibling Kozak-2, is provided with a troop-compartment fire extinguishing system, an automatic tire inflation (ATI) system, an air filtra-

tion and ventilation system, and front/rear window heaters. It features an advanced protection from ballistic and mine blast threats.

Being a unibody, independent suspension vehicle, Kozak-2M is built on the Iveco Eurocargo 4x4 chassis rated for 15t GVW. Armor protection is made from 12mm-thick Stanag-4569 Level 2 compliant armor steel plates produced by Miilux, Finland. Protection of the vehicle's critical areas is additionally provided with three-layer plates with a splinter proof spacer that doubles as a heat insulator.

Kozak-2M has been designed with a comprehensive range of anti-mine blast protection measures to provide the crew and passengers with an enhanced level of protection and overall survivability. It has modular layout and a V-shaped hull bottom designed to absorb and deflect part of the force of explosions away from passengers inside the armored hull. This is complemented by a multilayer floor that too absorbs part of the detonation energy and additionally reduces the secondary effects of fragments being projected inside the vehicle. Anti-mine protection withstands 6kg of TNT equivalent blast under any wheel or anywhere under the hull.

The vehicle has blast attenuating, ceiling suspended seats that Practika developed single-handed, leveraging on international expertise and experiences.

The roof of the vehicle can accommodate a remote weapons station or a one-man turret.

Kozak-2M was successfully passed through a round of MoD trials earlier in 2017. It was then field tested in military exercises conducted by the Ukrainian Armed Forces General Staff. The exercises included drills where the vehicle

Kozak-2M was successfully passed through a round of MoD trials earlier in 2017. It was then field tested in military exercises conducted by the Ukrainian

was airlifted to different training locations, negotiated water obstacles, and was driven in different road and terrain settings. Performance of the vehicle was found satisfactory by the Airborne Forces, Special Operations Forces and the General Staff, as claimed by Practika.

## KOZAK-2M LACV KEY SPECIFICATIONS AND TECHNICAL DATA

| | |
|---|---|
| Wheel configuration | 4x4 |
| Hull | armored |
| Gross vehicle weight | 15,000 kg |
| Combat loaded weight | 13,500 kg |
| Seating capacity | 8 + 1 (driver) |
| Fuel tank capacity | 190±5 l |
| Range | ≥ 1,000 km |
| Max. highway speed | 120 km/h |
| Ground clearance height when fully loaded | 415 mm |
| Max. allowed gradient angle | 30 o |
| Max. allowed slope angle | 17 o |
| Fording depth | 1 m |
| Turntable 7.62 mm/12.7 mm turret gun | Available as a basic equipment fit |
| Remote 7.62 mm/12.7 mm weapon station | Optional |
| Automatic 30 mm grenade launcher | Optional |
| Engine | 6-cylinder, 205 kW/279 hp Iveco Tector diesel |


# OTAMAN 8X8 ARMORED FIGHTING VEHICLE. KEY SPECIFICATIONS AND TECHNICAL DATA

| | |
|---|---|
| Gross Vehicle Weight | 10,500 kg |
| Length | 7,340 mm |
| Width | 2,840 mm |
| Vehicle roof height | 2,140 mm |
| Engine | Iveco diesel |
| Engine power | 238 hp |
| Engine torque | 1020 N*m |
| Transmission | hydrostatic |
| Ballistic protection level | STANAG 4569 Level II (+ optional ceramic armor protection) |

The Otaman 8x8 vehicle, developed by Practika as a heavily upgraded version of the proven Soviet-era BTR-60 APC technology, is offered as a cost-effective platform for a family of specialist vehicles requiring improved survivability and large armor-protected volume (command and staff vehicle, battlefield ambulance, mortar carrier etc).

The new hull of the Otaman vehicle is made of modern armored steel that far exceeds in protective properties the armor steel used in the baseline vehicle's hull. Such steel has a very high hardness combined with high ductility and tensile strength.

Otaman's hull has been tested for compliance with the international standards for ballistic and anti-mine blast protection PM2000, STANAG 4569, EN1522, MIL-A-46100d, and Ukraine's DSTU 3975-2000 standard.

Arrangement of the compartments in the Otaman 8x8 vehicle has been changed compared to the original compartments arrangement seen in the BTR-60. The engine compartment is located in the front portion of the vehicle's hull, while the troop compartment is in the rear of the vehicle. So the troops enter and exit the vehicle via a rearward door, this facilitating the safety and security of soldiers while mounting the vehicle.

Otaman features a new powerpack that differs fundamentally from that found in the original vehicle. In contrast to the BTR-60 with its two rear-located gasoline engines coupled to a manual transmission, Otaman uses a new Iveco diesel, with torque transmission from the engine to all the wheels being provided via a customized hydrostatic transmission.

The new vehicle, owing to its high torque engine, has got much better off-road performance, permitting it access to tough terrains that were otherwise inaccessible to the BTR-60 original.

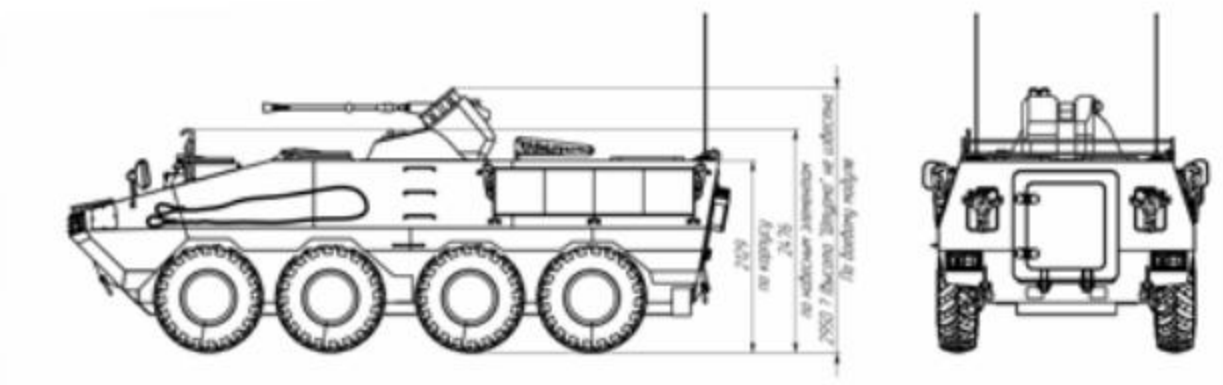
The Otaman can be equipped with a remote weapon station allowing the gunner to operate the weapon while being protected by the vehicle's armor. The weapon station will be equipped with a 90mm/105mm gun, in addition to a full set of stabilization devices and means of situational awareness.

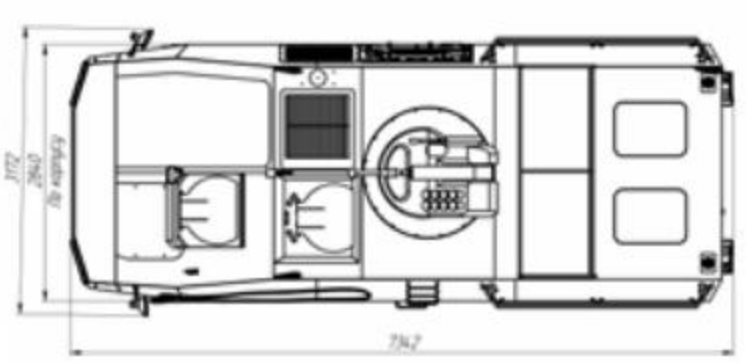
The Otaman upgrade pack includes an improved, new level of comfort for the crew and passengers, provided due to the use of a dual-zone heater, an air conditioning and filtering system and NRBC filters.

The baseline BTR-60 vehicle provides no protections against mine and IED blast threats. The Otaman upgrade comes with an improved IED blast protection package consisting of multilayer, blast energy absorbing bottom hull, anti-mine floor protection and energy absorbing, blast attenuating seats.

Otaman 8x8, while afloat, is propelled by two screws located each side at the back. Although having a hull of water proof construction, Otaman is provided with water pumps needed to prevent water from getting inside the vehicle when negotiating water obstacles.

The Otaman 8x8 vehicle will be showcased at the Arms & Security exhibition in Kyiv in October 2017, following completion of automotive trials. UDR





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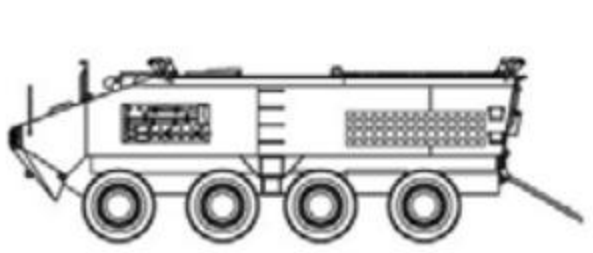
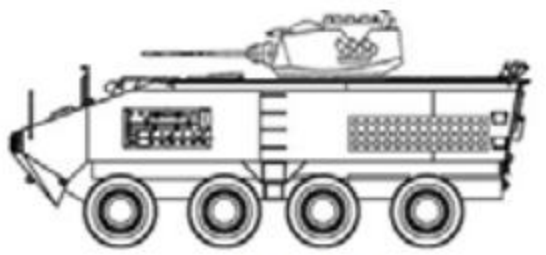
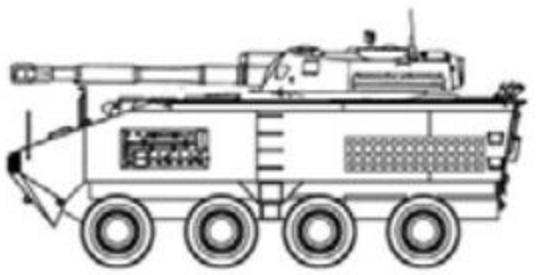


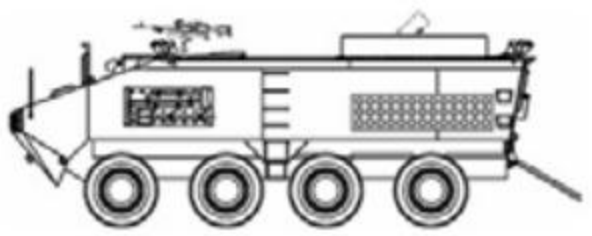
Armored Personnel Carrier



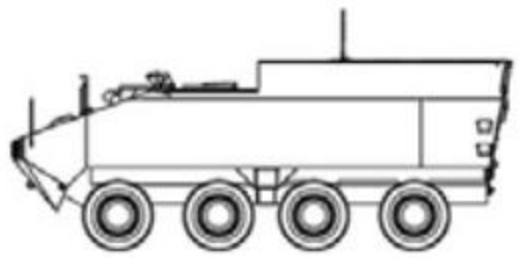
Infantry Fighting Vehicle



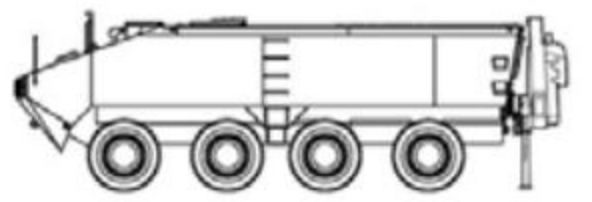
Wheeled Tank



Mortar Carrier



Ambulance



Repair Vehicle

The Otaman 8x8 vehicle, developed by Practika as a heavily upgraded version of the proven Soviet-era BTR-60 APC technology, is offered as a cost-effective platform for a family of specialist vehicles requiring improved survivability and large armor-protected volume (command and staff vehicle, battlefield ambulance, mortar carrier etc).

# ТЕПМ-3000

# ТЕПМ-3000

# CRACKED REPUTATION – ARMS TRADE BUSINESS, RUSSIAN STYLE

Oleksiy SERDUIK for UDR

**The Russian Federation has regularly been ranked among the world's biggest arms suppliers, which is no surprise, given the huge defense industrial capabilities the country inherited with the demise of the Soviet Union. At this stage in time, however, these capabilities have often been used for illegal arms supplies to destinations outside Russia. No matter the reasons or excuses, but inexplicably, various conflict-torn regions worldwide are awash with Soviet/Russian-built weapons...**

Kremlin-controlled media, as in Soviet times, are reluctant to report any negative news involving illegal arms supplies from Russia. After all, this doesn't neatly fit into Moscow's current policy of blaming all sins on the West and of portraying Russia as a stronghold of honesty, decency and justice. Reality, however, shows otherwise.

Subversion and military confrontation in Eastern Ukraine, ongoing since 2014, has been a clear demonstration of the Kremlin's blatant disregard for international law and of its "I do what I want" policy. Now there is a whole lot of evidence in place suggesting that Russia has illicitly supplied a diverse range of weaponry and ammunition to the Donbas conflict area. These include some brand-new weapons and military equipment types that could have come from nowhere else but Russia, in addition to huge numbers of BMP-1/2 armored fighting vehicles, T-64BV and T-72 tanks, BM-21 Grad MLRS, Fagot and Metis ATGW launchers, and RPG-7 anti-tank rocket grenade launchers. Russia claims the weapons were all captured from Ukrainian government forces, but in actual fact they came illegally into Ukraine from Russia across the rebel-controlled borderline.

Among the range of armaments used by Russia-backed separatist rebels in Eastern Ukraine there could be seen the drone systems

Orlan-10, Zastava, Tachyon, Grusha, Garnet, and Forpost; tanks T-72B3 and T-72BA; armored fighting vehicles BTR-80AM, BMM-97 Vystrel/Dozor and Tiger; multiple rocket launchers TOS-1 Buratino; self-propelled SAM/rocket and gun systems Pantsir-S1; electronic countermeasure systems 1RL257 Krasuha-4 and MKTK-1A Dziudoist; lightweight counter mortar radar systems Aistenok; sniper rifles KSVK/ASVK Kord, and the latest Kalashnikov assault rifles. Russian officials, predictably, refuted these allegations, branding them as "lies", "photoshopped evidence", and "charges without merit" and insisting that "we were not and are not there". But the facts, however, indicate the opposite.

Moreover, Ukraine is not the only, unique example of such behavior by the Russian Federation. A very similar situation was also observed in Georgia in August 2008; Russia illegally moved substantially large numbers of various armaments in Georgia's South Ossetia and Abkhazia regions under the de facto control of Russia-backed separatists to support its military operation against Tbilisi.

Overall, if you turn to history, you'll see a great many instances where Russia was to some or other extent involved with illegal arms sales to different destinations across the Globe.

It's worth mentioning just the hijacking of the cargo ship Arctic Sea in 2009. According to a widely circulated theory, the ship was transporting anti-aircraft weapons and cruise missiles destined to Iran – an allegation vehemently denied by Russian officials. Analysts believe, however, that it was a high risk of uncovering a distribution chain of illegal arms trafficking that forced Russia to resort to cover-up operation, to stage a hijacking of the ship and, in the long run, to liberate it courageously. Former commander of the Estonian Defense Forces Tarmo K uts was quoted in the Estonian newspaper Postimees as saying, "Only the presence of cruise missiles on board the ship can explain Russia's strange behavior in this whole story. As a seaman with many years of experience, I can assure you that the official versions are not credible".

Tank T-72BA in Donbass

Many are also aware of the story of Viktor Bout, Russian arms dealer who was arrested in Thailand in 2008 before being extradited in 2010 to the United States to stand trial on terrorism charges after having been accused of intending to smuggle arms to the Revolutionary Armed Forces of Colombia (FARC) for use against U.S. forces. He was convicted in 2011 and sentenced in April 2012 to 25 years imprisonment by a U.S. judge. Moscow, again, denied the claims, but there is no smoke without fire. As Bout's nicknames, "Death Merchant" and "Armaments Baron", imply, he had great capabilities with regard to the export of Russian armaments, and it looks incredible that he could do his business without high consent of Russia's military-political establishment with its decades-built, highly centralized vertical power structure.

Russia "Forpost" UAV in Donbas conflict area

A separate mention should be made about Russia's trade in the Middle East. Syria has been in civil war for a long while now, which began with popular protests against the government of Bashar Assad. Russian arms sales to Assad's Regime have grown several-fold since the start of conflict. Officially, Moscow said the sales were part of previous contracts, but was unable to explain why the number of the contracts had increased so suddenly. Here, there is doubt that

these arms sales are paid for, because it is a known fact that Assad's Regime just has no capacity to absorb the giant arms acquisitions from Russia, which include light firearms, anti-aircraft/anti-ship missiles, S-300 SAM systems, T-72/T-80 tanks, and MiG-29/Su-25 fighter aircraft, not even countering supplies of ammunition.

The Kremlin isn't even squeamish about "trading" with terrorist groups. In 2011, Russian weapons became an apple of discord between Jerusalem and Moscow. Palestinian militants from Hamas hit an Israeli school bus with a Russian-produced Kornet ATGW missile. Israel issued a protest, but Russia was left unpunished.

In January 2016, Israel's YNetNews.com and the American news and opinion website "The Daily Beast" reported citing "mid-level Hezbollah commanders" that Russia was selling shipments of artillery gun weapons and anti-tank munitions directly to Hezbollah "without caring whatsoever about what the weapons will be used for". It was noted at the same time that there is full coordination in place among the Assad's Regime, Iran, Hezbollah and Russia, and a direct relationship between Russia and Hezbollah is tending to grow.

And this despite the fact that the whole civilized world has labeled Hezbollah as a terrorist organization, while Russia has not done so for some reason. As an interesting note, Russia has not put Hezbollah – an organization that has carried out hundreds of terror attacks, including against Russian nationals – on its list of terrorist groups, but included therein the Islamic group Hizb ut-Tahrir that has committed not a single act of terror over 50 years of its existence.

History of Russia's dubious arms trade in the Middle East is not limited to illegal arms supplies to Hamas and Hezbollah. There are plausible grounds to charge the Kremlin of supplying weaponry to the terrorist group Islamic State (ISIS). The ISIS has been only formally opposed to Assad's forces for a long while, attacking mostly Syrian rebels, Kurds, and Sunni insurgent groups instead. ISIS militants have been active primarily along the Syrian borders with Iraq and Turkey - that is, the locations of future routes of oil and gas pipelines to Europe. Moscow could not transfer weapons to ISIS forces in a transparent manner, because ISIS is officially ranked as terrorist group by Russia. A number of fake operations were staged where Syrian military bases were "assaulted" by rebel forces. Assad's forces retreated without actually fighting, abandoning their bases and extensive arsenals of weapons, which then were "captured" by ISIS forces. So, in actual fact, it was nothing less than a supply of weapons guised as the "capture of spoils of war". It is noteworthy that this practice was eventually abandoned as the situation changed.

BM-30 in Syria

Palestinian militants from Hamas hit an Israeli school bus with a Russian-produced Kornet ATGW missile. Israel issued a protest, but Russia was left unpunished.

Something similar happened in Iraq. After a clash with ISIS militants, Iraqi government forces retreated with little fighting, leaving behind weapons warehouses that stored brand-new Russian-built BTR-90 armored fighting vehicles among other types of military equipment. ISIS, in defiance of all expectations, had no difficulty finding adequately trained personnel to use the equipment to best effect.

Tehran does not sit in the sidelines either. In August 2017, the German newspaper Die Welt reported citing Western intelligence sources that Russia and Iran set up a "new smuggling route" for transporting illegal military supplies from Iran to Russia through Assad-held Syria. In the opinion of the German newspaper, the two countries thus violate the UN Security Council resolution 2231, which bans the transfer of weapons to and from Iran.

Die Welt claimed that in June, Iranian airplanes landed twice at the Khmeymim airfield, the key airbase of the Russian military in Syria. They carried the equipment involved in construction of heavy weaponry, which then was shipped further to Russia.

The equipment was loaded onto trucks and taken to the Syrian city port of Tartus on the Mediterranian Sea.The Russian ship Sparta III then delivered the equipment a few days later to Russia's main Black Sea port of Novorossiysk.

In this context it is to be noted that it was not the only instance of Russia's disregard for international law. In 2015, Russia vetoed a draft proposal by the United Nations Security Council to impose targeted sanctions on South Sudanese military from the two warring parties. The UN draft resolution would expand the powers of a high level panel with regard to monitoring sources of funds for and tracking weapons being moved in South Sudan's areas engulfed in arms conflicts. Russia's veto was supposedly aimed to prevent a UN discussion of the use of Russian-supplied cluster munitions RBK-500 AO-2.5 RT by the Sudanese Air Force against rebels from the Sudan People's Liberation Movement – North (SPLM-N) in the South Kardofan province on April 15, 2012.

Afghanistan is one of the most notable examples of Russia's involvement in illicit arms trade deals. On July 24, 2017, CNN aired two videos suggesting that two separate groups of Taliban fighters have received "improved weaponry … that appears to have been supplied by Russian government," including heavy machine guns, sniper rifles, and Kalashnikov assault rifles. The news attracted huge media attention. The U.S. Secretary of State Rex Tillerson accused Russia of supplying arms to the Afghan Taliban, in violation of international law and UN Security Council's resolutions. His remarks came just days after President Trump announced a new open-ended U.S. military commitment to Afghanistan.

The Kremlin's response was quite predictable. Maria Zakharova, a spokeswoman for Russia's Foreign Ministry, refuted the claims as "anti-Russian propaganda".

A separate mention could be made about Russian sales of defense technology. The question still remains unanswered as to how North Korea – a country under a comprehensive and open-ended UN arms embargo that prohibits the export of weapons to and import of weapons from North Korea – is able to create a diverse range of weapons technologies, including especially rockets and missiles, which, curiously enough, are very similar to their Soviet/Russian-designed counterparts (and most experts are well aware of the answer…).

A highly classified topic, the illegal arms trade is difficult to assess in numerical terms. Rough estimates put Russia's illicit arms exports at 5% to 15% of the country's total arms transfers. Specifically in the early 2000's, illegal sales amounted to USD 380 million of Russia's total arms exports of USD 3.8 billion. Respective figures are far higher today, as the terror threat is growing globally, and regional conflicts are aggravating threats to global security.

On July 24, 2017, CNN aired two videos suggesting that two separate groups of Taliban fighters have received "improved weaponry … that appears to have been supplied by Russian government," including heavy machine guns, sniper rifles, and Kalashnikov assault rifles.

Against this backdrop, Russia exported USD 14.5 billion worth of weaponry in 2015 and a little bit over USD 15 billion in 2016, and will certainly continue on this trend in coming years.

As at this date, history of Russia's illicit arms trade is rich and diverse, proving that the country is indeed a stubborn violator of international law and of ordinary moral and ethical principles. But the world community, unfortunately, seems to be inclined to watch from the sidelines; it does not go further than to come up with only sporadic criticism instead of taking appropriate, long-overdue measures. UDR

## REFERENCE LIST:


1. Russia Is Arming Hezbollah, Say Two of the Group's Field Commanders, http://www.thedailybeast.com/russia-is-arming-hezbollah-say-two-of-the-groups-field-commanders
2. Arctic Sea, https://ru.wikipedia.org/wiki/Arctic_Sea
3. Israel Defense Forces bomb out S-300 SAM systems deployed outside Damascus, supplied by Russia to Hezbollah terrorists https://joinfo.ua/inworld/1058035_Armiya-Izrailya-razbombila-rossiyskie-ZRK-S-300.html
4. Russian Kornet ATGW already in service with Hezbollah, Hamas and, now, ISIS. What comes next? https://www.ukrinform.ru/rubric-other_news/1940145-rossiyskie-ptrk-kornet-na-vooruzhenii-hizballa-hamas-i-uje-igil-chto-dalshe.html
5. Russia is the biggest supplier of weapons to terrorists, ethnic conflicts, and organized crime, https://informnapalm.org/3816-rossyya-krupnejshyj-postavshhyk-oruzhyya/
6. CNN: Russia is supplying weapons to Taliban terrorists, . www.newsland.com/user/429780348 2/content/cnn-rossiia-postavliaet-oruzhie-terroristam-talibana/5929058
7. Secretary of State accuses Russia of supplying arms to Taliban, http://www.stanradar.com/news/full/26228-glava-gosdepa-obvinil-rossiju-v-postavkah-vooruzhenija-talibam.html
8. The Daily Beast: Russia Is Arming Hezbollah, Say Two of the Group's Field Commanders,
9. https://www.unian.net/world/1232711-the-daily-beast-rossiya-voorujaet-hezbollu-govoryat-dva-komandira-organizatsii.html

# STATE KYIV DESIGN BUREAU «LUCH» – THE LEADING

**BARYER V** | EXTENDED RANGE ATG MISSILE AND LAUNCHER OPTIMIZED FOR USE FROM AERIAL PLATFORMS

**BARYER** | VEHICLE-CARRIED LOG-RANGE ATG MISSILE SYSTEM


**KOMBAT** | GUIDED MISSILE ROUND


**KONUS** | GUIDED MISSILE ROUND


**FALARICK 105** | 105 MM GUIDED MISSILE ROUND


**STUGNA** | GUIDED MISSILE ROUND


**FALARICK 90** | 90 MM GUIDED MISSILE ROUND


**KORSAR** | MAN-PORTABLE ATG MISSILE AND LAUNCHER


Type of carrier platform
Missile mass
Missile diameter
Missile length

# DEVELOPER OF ANTI-TANK SYSTEMS IN UKRAINE

25 kg | 1609 mm | 130 mm ∅ → **7,5 km** → **800 mm**

**5 km** → **800 mm**

Light portable missile system Corsar

**5 km** → **750 mm**

**5 km** → **700 mm**

**5 km** → **550 mm**

Man-portable rocket grenade launcher

**5 km** → **550 mm**

**4 km** → **550 mm**

**2,5 km** → **550 mm**

Man-portable ATGW system Skif

Armor penetration capability

# UKRAINE DEVELOPS ITS FIRST INDIGENOUS THERMOBARIC WEAPONS

**State-owned defense industries group Ukroboronprom, Ukraine's major defense contractor, has developed new thermobaric weapons products – the RPO-16 rocket-propelled flamethrower (developed by Ukroboronprom's Scientific Research Institute of Chemical Products) and RGO-27S and RGT-27S2 thermobaric grenades (State-owned Artem Holding Company).**

The new weapons were demonstrated for the first time during field trials at Honchariv Firing Range outside Chernihiv, attended by Oleksandr Turchynov, Ukraine's National Security and Defense Council Secretary in late July 2017.

It will be recalled that thermobaric weapons, otherwise referred to in military literature as fuel-air explosive (FAE) munitions, are intended to defeat the enemy by generating a cloud of high-temperature flame (blast), thus allowing for significant incendiary effect in addition to the massive pressure wave.

The RPO-16 is man-portable, rocket-propelled flamethrower firing a 93-mm rocket with a thermobaric filler to defeat enemy personnel, even those sheltered behind strong physical barriers.

The blast effect of the thermobaric RPO-16 warhead is roughly equivalent to the blast effect of a large-caliber HE artillery shell.

Upon completion of the trials, O. Turchynov was left satisfied with the results, saying the new product showed itself to be an effective weapon, and the "RPO-16 flamethrower looks impressive".

Artem's RGO-27S and RGT-27S2 thermobaric grenades were demonstrated during that same testing event at Honchariv Firing Range.

Each of the grenades weighs under 600 grams. Upon explosion, it generates a 13 cubic meter, 2.500o C flame cloud lasting as long as two seconds. It is claimed to be effective against personnel and light armored equipment.

Russia is known to possess an arsenal of thermobaric weapons and was reported to have used them extensively against Ukrainian government forces deployed in the Donbas conflict area. Now that Ukraine has got possession of similar weapons, it has achieved a degree of parity with the enemy in terms of thermobaric weapons capability.

Overall, it's no doubt good news that Ukroboronprom has started work to develop this class of weapons and make them available to Ukraine's military. And there is hope that the new Ukrainian products, following the successful completion of qualification trials, will become interesting to potential export customers too. UDR

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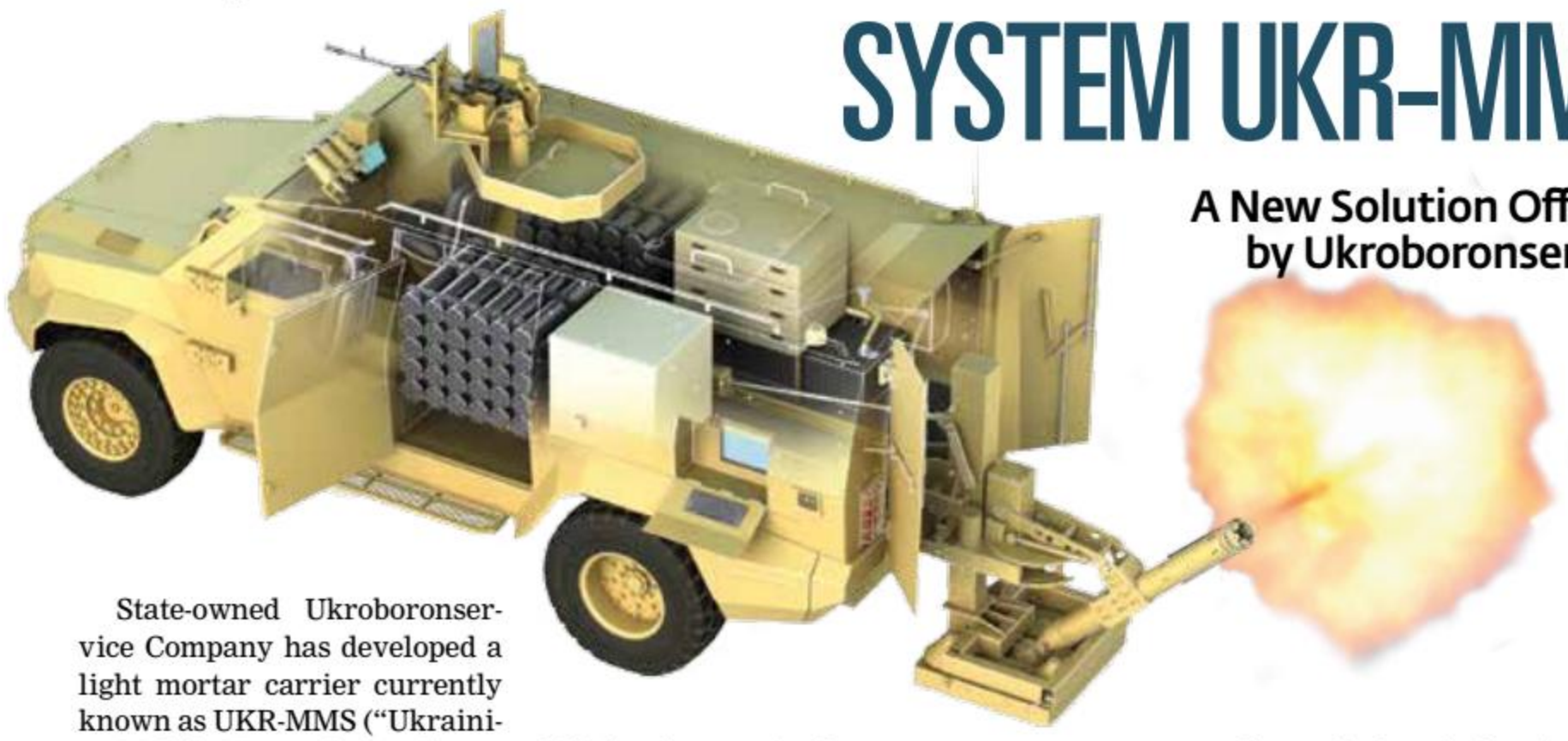
# MOBILE MORTAR SYSTEM UKR-MMS

## A New Solution Offered by Ukroboronservice

Serhiy ZGHURETS,
Defense Express



State-owned Ukroboronservice Company has developed a light mortar carrier currently known as UKR-MMS ("Ukrainian Mobile Mortar System").

In 2016, the Company unveiled its concept for a self-propelled mortar system mounted on the BARS-8 armored vehicle, and now it has got an international partner to deal with it. The new product represents a fusion of experience and expertise of two partners – Ukroboronservice and Everis Aeroespacial Y Defensa S.L.U, Spain.

Ukroboronservice has long worked on this concept, and first demonstrated a prototype at Kyiv Arms and Security exhibition in 2016. At the current stage of development, the UKR-MMS is a vehicle-mounted, automatically controlled mortar system that incorporates most effective solutions responding to the needs of the military arising from challenges faced in modern conflict scenarios – the absence of clear-cut frontlines, growing importance of tactical forces on the battlefield, and tight time limitations for dealing with time critical targets. So, the mortar system has to have capabilities to detect the threat, find out its location accurately, engage it with precision fire within the shortest time possible, and to immediately move away from the location to avoid enemy counter fire. All of these capabilities are implemented in the UKR-MMS, which, like its previous iteration, is carried on an armored vehicle platform. Mobility, precision, intuitive control, modular architecture -- this all is embedded into the new UKR-MMS mortar product.

The UKR-MMS has been developed to be an effective means

of precision fire support for infantry units attached to company through battalion level. Its key subsystems include the computerized fire control system, mortar control equipment, mortar set-up and laying system, and the mortar proper (or, more specifically, the mortar barrel). This all, plus a load-out of ammunition is carried on a mobile armored platform – the BARS-8 armored vehicle, effectively making it into an autonomous mission capable unit.

The host platform is equipped with a computerized fire control system, and mortar gun laying is carried out by mortar control equipment via a system of mechanisms and drives. The weapon goes from transport to firing in five seconds or less, and back from firing to transport in less than 15 seconds. A well-trained mortar-gun crew could achieve maximum rate of 12 rounds per minute. Maximum firing range is 7,200 m with standard rounds. The BARS-8-mounted mortar-gun is provided with 60 rounds of ammunition. The vehicle has a crew of three men, including commander, driver and gunner.

The agility of operation and high first-round hit probability are achieved through the use of hardware and software solutions implemented in the UKR-MMS product. The system is equipped with a computer-aided fire control system. Operators' screens display data on potential targets, which usually arrives from outside sources in addition to the system's organic sensors. Mortar-gun laying is carried out automatically using a computer-aided targeting gear. Firing chart, GIS data and target data are stored in the MMS Battery commander's computer that communicates via a wireless network with WCSs of each of the MMS Battery's vehicles equipped with GPS, orientation sensor and weapon elevation sensor.

Once the MMS vehicle arrives at a firing position and is brought to a full stop, it's GPS location coordinates are automatically identified; the mortar-gun is deployed into ready-to-fire mode; firing data is calculated automatically; the mortar is laid onto the target; laying parameters are restored after a round is fired; and fire is adjusted based on data from a forward observer or a reconnaissance drone operator. Once the fire mission is completed, the MMS vehicle is then relocated immediately before counter-fire can be made.

The weapon is easily controlled owing to a well-thought-out, user-friendly software interface. Roughly speaking, most operations are performed by just pressing a single button. Ease of operation and of access to controls on the equipment results in an extremely shallow learning curve for new users. No less importantly, the computerized fire control system can be easily integrated into the Customer's command-and-control networks.

The mortar set-up and laying system and the baseplate are important components developed by the Spanish partners for the 120-mm light mortar carrier (LMC) designated Alakran. When travelling the mortar is stowed in the horizontal position and when required for action is traversed through the rear until a large square baseplate is in touch with the ground. To lay the mortar onto targets an electro-mechanical system is used, with a manual backup in case of power failure. The traverse arc of the mortar is ± 60°, while the elevation is from 45 ° to 80 °. The square support plate of the 120-mm mortar, mounted on the rear platform of the carrying vehicle, transmits the recoil forces directly to the ground. After completing a fire mission, the mortar can be stowed for transport within seconds, in full conformity to the shoot-and-scoot tactics.

The mortar set-up and laying system is interesting in that it can accommodate barrels ranging from 81 mm to 120 mm, the latter being the best choice in terms of the ability to deliver heavier payloads to relatively long distances, hence to achieve the most favorable compromise between weight/size and the amount of firepower delivered.

The system can be integrated onto a wide range of wheeled platforms that have the ability to carry a payload of 1.5 tonnes without any need for substantial redesign or structural reinforcements. It is suitable for integration onto 4x4 pickup vehicles, 4x4 armored cars, light trucks, and tracked/wheeled armored vehicles. Ukroboronservice has developed several versions of the mortar carrier to meet varying needs of potential export customers. UDR

FORT

Science-Industrial Association «Fort» is leading enterprise in Ukraine which develops and serially produces different types of firearms.
For the moment company manufactures modern weapon with high ballistic characteristics that is confirmed by the results of numerous tests including state tests.
The enterprise is also the main supplier of the weapon for divisions of National police and the National Guard of Ukraine.

## Fort-600
(Grenade Launcher)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Caliber, mm | 40 | Trigger mechanism | double action only(DAO) | Barrel length, mm | 280 | Trigger pull, kgf | not more 5 |
| Working ammunition | Low speed grenades of caliber 40x46 mm (HE M6P, TPT M6P, HEDP M7) and other grenades of cal. 40x46 mm NATO | Dimensions with butt stock extended, mm | 670x196x54 | Maximum firing range, m | 400 | Weight without grenade, kg | 2,8 |
| | | Dimensions with butt stock folded, mm | 365x196x89 | Minimum firing range, m | 50 | | |

## Fort-500 M1S

| | | | | | |
|---|---|---|---|---|---|
| Caliber, mm | 12/76 | Length with folded butt-stock, mm | 585 | Magazine capacity, rds | 4 |
| Operation mode | Pump-action | Barrel length, mm | 345 | Trigger pull, kgf | 2,5-3,5 |
| Length with extended butt-stock, mm | 845 | Weight with an empty magazine, kg | 4,3 | Type of butt-stock | Metallic folding |

## Fort-500 MS

| | | | | | |
|---|---|---|---|---|---|
| Caliber, mm | 12/76 | Length with folded butt-stock, mm | 780 | Magazine capacity, rds | 4 |
| Operation mode | Pump-action | Barrel length, mm | 345 | Trigger pull, kgf | 2,5-3,5 |
| Length with extended butt-stock, mm | 878 | Weight with an empty magazine, kg | 4,1 | Type of butt-stock | Telescopic |

# Fort-14PP

| | | | |
|---|---|---|---|
| Caliber | 9 mm Luger | Weight with empty magazine, up to, kg | 0,95 |
| Operation mode | short recoil system | Trigger pull force, kgf | 1,5 - 2,5 |
| Trigger mechanism | Double action SA/DA | Magazine capacity, rds | 16 |
| Overall length, mm | 218 | Accuracy range, m | 25 |
| Height, mm | 140 | Rate of fire shots / min | 50 |
| Width, mm | 35 | Rifling | 6 grooves |
| Barrel length, up to, mm | 116 | | |

# Fort-19

| | | | |
|---|---|---|---|
| Caliber | 9 mm Luger | Weight with empty magazine, up to, kg | 0,77 |
| Operation mode | short recoil system | Trigger pull force, kgf | 1,5 - 2,5 |
| Trigger mechanism | SA/DA | Magazine capacity, rds | 16 |
| Overall length, mm | 208 | Accuracy range, m | 25 |
| Height, mm | 139 | Rate of fire shots / min | 50 |
| Width, mm | 35 | Rifling | 6 grooves |
| Barrel length, up to, mm | 112 | | |

# Fort-28

| | | | |
|---|---|---|---|
| Caliber | 5,7x28 mm | Width, mm | 33 |
| Operation mode | Semi-free bolt | Barrel length, up to, mm | 114 ± 0,5 |
| Trigger mechanism | DAO | Weight with empty magazine, up to, kg | 0,70 |
| Overall length, mm | 200 | Trigger pull force, kgf | 1,5-3,5 |
| Height, mm | 135 | Magazine capacity, rds | 20 |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# PERIMETER SECURITY RADAR SYSTEM X1-M GIVES NO CHANCE TO HOSTILE DRONES

## NEW X1-M AUTONOMOUS MOBILE RADAR SYSTEM PROVIDES NEW DETECTION CAPABILITIES FOR LOW RCS THREATS


Specialized Export & Import State-owned Company Progress, partnered with the Institute for Radio Astronomy of Ukraine's National Academy of Sciences unveiled its new product – the X1-M perimeter security radar system at the Arms & Security' 2017 exhibition in Kyiv. This new product represents a breakthrough domestic solution developed in response to an emerging threat coming from hostile unmanned aerial vehicles for different purposes ranging from reconnaissance/surveillance to air-to-ground attacks, as is the case in Ukraine's Donbas conflict area.

A hostile drone, however, cannot be disabled or shot down before it is detected and its precise position/location is identified. But this is actually easier said than done. As is well known, a key factor in the probability of detecting an aerial target is the target's radar cross sectional (RCS) area. Relatively large drones have a greater RCS, hence are more easily detected with a radar. Alternatively, small drones (tactical UAVs and quadcopters) have low RCS and are built largely from radar transparent plastic materials. Some targets, like quadcopters, for example, are slow flying, making their detection yet more difficult.

Developers of the X1-M radar proved they were able to resolve those challenges successfully. The X1-M is equally efficacious against airborne as well as ground and surface targets.

The new product has been successfully subjected to several rounds of trials both in Ukraine and abroad, and proved its competitive advantages. «During the most recent round of trials in a Baltic country, we were tasked to identify and detect potential threat targets to an object under our guard (an airfield in a wooded area). We successfully detected all the UAVs of up to ten different types ranging from quadcopters to high RCS robotic airplanes as well as human beings and vehicles moving in the area of interest», an official at Progress said.

The X1-M radar proved to be the best among the other six international counterparts competing for an urgent operational requirement of a Baltic military. This brings new promises in terms of future cooperation with Baltic countries in this particular area.

Also in September 2017, the X1-M radar was subjected to similar trials in Ukraine held under the aegis of the country's General Staff, with equally successful results.

The X1-M perimeter security radar system is designed with capabilities for detection of (slow) moving ground targets against terrain background; detection of low RCS aircraft in the surface layer; finding out the target's location coordinates (azimuth and range), RCS, ranging rate and the width of the Doppler spectrum, while a height finding capability is optional. The system offers a capability for integrating the radar's output data with conventional geographic information systems.

The X1-M radar can be deployed in stationary (fixed) installations or mobile platforms such as automobiles, trailers etc. UDR

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# UAV DRONE SIGNAL JAMMING

## PRIVATE VENTURE PRODUCTS OFFERED BY UKRSPETSTECHNIKA HC

Anton MIKHNENKO, UDR

**The recent extensive deployment of remotely piloted aircraft in warfare and as surveillance devices has driven the development of appropriate countermeasures. The Holding Company Ukrspetstekhnika has developed two products designed to deal with a broad spectrum of unmanned aircraft and drone threats. We are talking about the Polonez ("Polonaise") vehicle-mounted drone signal jamming system and an electronic gun that jams radio frequencies a mini-drone can use to communicate with the operator.**

To be able to jam hostile drone signals effectively, one needs to have a set of electronics equipment for timely detection, identification, and finding out location coordinates of target objects, and for subsequent jamming of operator-drone data communication links. He who possesses such capabilities can complicate the enemy's ability to achieve its objectives, and thus gain a tactical advantage for his own operational purposes.

Polonez is designed precisely to deal with this complex challenge. The drone signal jamming system will disable the enemy's ability to carry out aerial reconnaissance/surveillance by putting its rec drones out of commission.

The Polonez system consists of:

- EHF radar Lis-3M, updated and upgraded for this purpose; this will detect low RCS aerial targets and drones, and automatically communicate radar outputs to command and control centers, ZSU-2EM gun batteries and combat vehicles' weapons stations;
- EO module; this will lock on and track a detected target in the thermal imaging/infrared regions of the spectrum to enable identification of the target;
- frequency range monitoring and analysis unit; this will find out and analyze frequency on which the target drone is operating, on which basis an appropriate frequency-specific spot jamming signal will be generated;
- jamming device with an antenna array for jamming operator-drone data communication links;
- JPS/GLONASS signal jammer equipped with a set of antennas.

The Lis-3M radar and EO module are both mounted on a telescopic 5.5 m mast. The former is capable of detection ranges of 12 km for helicopters and 8 km for drones/UAVs, while the latter has line-of-sight range.

The Lis-3M detects and identifies targets automatically

while scanning a 360-degree azimuth at 0, 10, and 20 deg/s. Target data is displayed on the screen of a laptop computer in the form of a geo-referenced label with an assign ed target reference number, and includes parameters such as target type and range, azimuth and velocity.

The Lis-3M radar has a competitive advantage due to its ability to operate in all weathers and in zero visibility. Being an EHF, continuous-wave radar, it uses a low-power transmitter, which makes it less detectable by enemy countermeasures. Because the system uses code-shift modulation technique, it is almost insensitive to random noise or electronic countermeasures, neither does it generate electromagnetic interference with other systems on site.

Upon detecting a target within its assigned sector, the system issues an alarm to the Central Security Console. Target data is transmitted to display units via the RS-422 (485) interface using fiber optic datalinks. The same way is used to interface the radar to video cameras and EO module's thermal imagers for accurate identification of the target.

Jamming device for GPS/GLONASS signals and for operator-drone data communication links is no doubt a key component of the Polonez system. Developed as a derivative of the [man-portable GPS/GLONASS satellite navigation jamming system] Anklav ("Enclave") , it was unveiled to the public at Arms and Security 2016 exhibition in Kyiv, and subjected to departmental trials in the spring of 2017.

The Polonez system is carried on the chassis of the Renault Trucks ACMAT PROTÉGÉ Light Tactical Vehicle (ALTV). The vehicle has been adopted by NATO militaries. It is built to the EN 1063 Level B4+ standards for ballistic protection, and has a payload capacity of 1,000 kg.

The Polonez has been developed as a private venture by Ukrspetstechnika.

In addition to Polonez, the Company has developed a drone gun that disrupts remote control of a mini-UAV/drone or its GPS/GLONASS signal and thus prevents unauthorized or hostile drones from flying over sensitive or vulnerable sites. The weapon consists of a signal jamming unit, a battery and an antenna array attached to the gun's grip.

The operator, upon detecting a hostile drone at a visible distance, turns on the jamming signal transmitter, directs the gun to the drone and presses the trigger button, forcing the trespassing drone to land.

The rifle-shaped jammer stands out favorably among its Western-designed counterparts by the ability to create a "protective electronic dome" of 5 km in radius around the object being guarded to prevent penetration of the trespassing drone swarm, in addition to the ability to generate spot jamming signals with pinpoint precision.

There are reasonable expectations that Ukrspetstechnika's Polonez and drone gun, although being private-venture products, will generate interest among potential consumers both in Ukraine and elsewhere, given the growing relevance of countering drone threats. UDR

[tendention]

# ATTACKING FALCON

PJSC "Chernihiv Radio Equipment Plant" (otherwise known as PJSC "CheZaRa") offers Ukraine's Armed Forces its unmanned aircraft system Sokil (meaning "falcon" in Ukrainian), which is designed to perform the dual role of tactical ISR UAV and ground attack UAV.

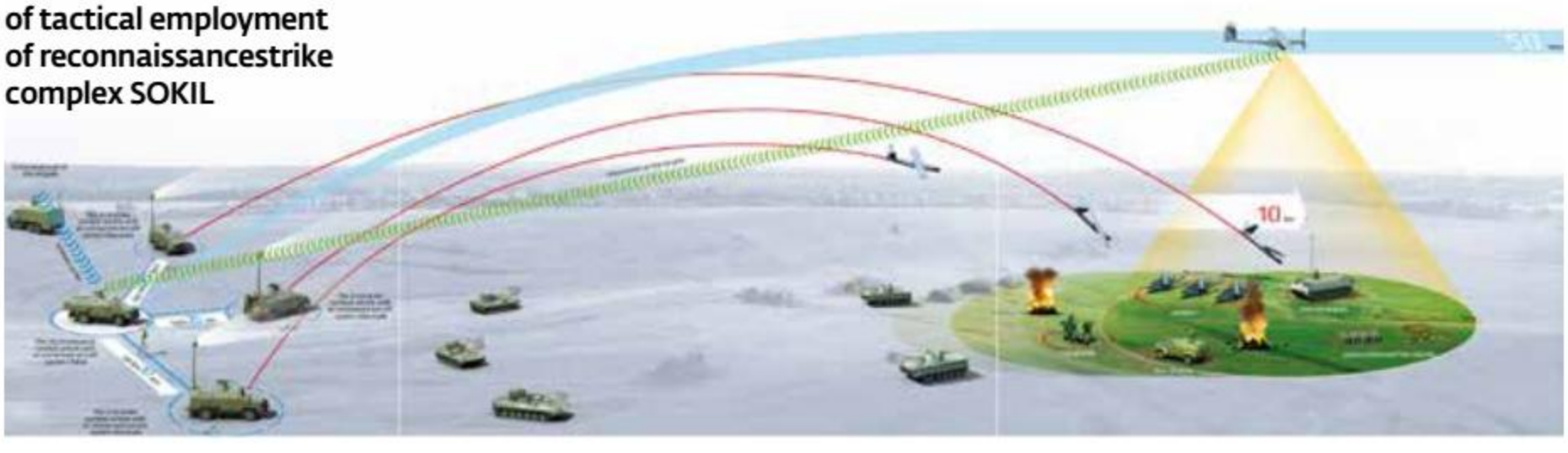
The Sokil UAS was developed as a private venture by member companies of the Ukrainian League of Defense Industries. It consists of two UAS vehicles (developed and built by WB Electronics, Poland) integrated with a shared ground control station.

One is the Fly Eye UAV system, which is already in service with Ukraine's Armed Forces. It is intended to provide advanced aerial reconnaissance capabilities to deployed forces. It would operate within a 50-km range, performing observation, surveillance, and target detection roles and finding out location coordinates of the targets detected.

The other is Warmate combat unmanned air system capable of destroying targets at a maximum range of 30 km. Described by the Designer as a "suicide" drone, the Warmate UAV is designed with a pair of vertical tail fins arranged in V-shape, allowing for airspeeds of up to 80 km/h. With its length of 1.1 m and wingspan of 1.4 m, the drone has a take-off weight of 4 kg and has an air endurance of 30 minutes (which can be optionally extended to 50 minutes).

The Sokil UAS is proposed in a package with several warhead types ranging from 530 g to 1,350 g TNT. JDR

The scheme of tactical employment of reconnaissancestrike complex SOKIL



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